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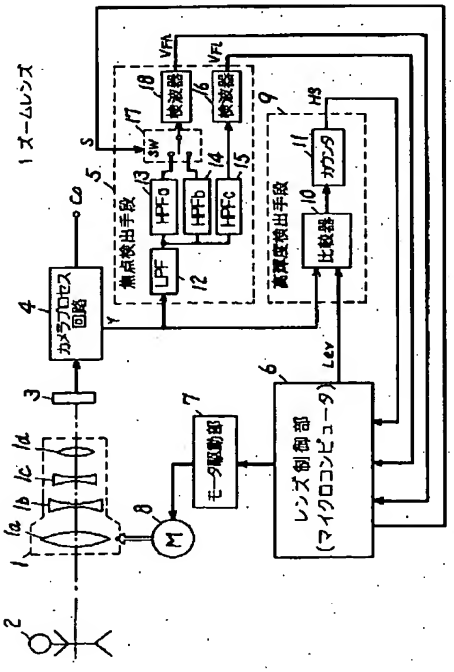
(54)【発明の名称】　自動焦点調節装置およびビデオカメラ

(57)【要約】

【目的】　本発明はビデオカメラなどの画像入力システムの自動焦点調節装置に関するもので、特に高輝度の被写体に対して誤動作のない、応答性の良い自動焦点調節装置を提供することを目的とする。

【構成】　高輝度情報を抽出する高輝度検出手段９の出力を用いレンズ制御部６で被写体状況を判断して、被写体のコントラスト情報を抽出する焦点検出手段５の出力を制御し、ステッピングモータ８により自動焦点調節する。



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【特許請求の範囲】

【請求項１】被写体を撮影する撮影レンズと、前記被写体の焦点情報を検出する焦点検出手段と、前記焦点情報の検出範囲において輝度成分がある輝度設定値を越える画像のサンプル点のカウント値を出力する高輝度検出手段と、前記撮影レンズの一部であって、焦点調節機能を有する焦点調節用レンズ部を前記撮影レンズの光軸上に沿って移動させ焦点調節を行うレンズ駆動手段と、前記レンズ駆動手段に前記焦点調節用レンズ部を駆動すべき方向、駆動速度あるいは停止を指示するレンズ制御部を備え、前記レンズ制御部は前記焦点検出手段の検出結果と前記高輝度検出手段の検出結果に基づき前記被写体の合焦点へ前記焦点調節用レンズ部を制御することを特徴とする自動焦点調節装置。

【請求項２】レンズ制御部は、高輝度検出手段の出力であるカウント値が一定設定値を越える場合に高輝度撮影状態と判断し、被写体の合焦点へ焦点調節用レンズ部を制御することを特徴とする請求項１記載の自動焦点調節装置。

【請求項３】高輝度検出手段は、焦点情報の検出範囲において輝度成分がある輝度設定値を越える走査線の本数のカウント値を出力することを特徴とする請求項１記載の自動焦点調節装置。

【請求項４】焦点検出手段は、少なくとも２種類のカットオフ周波数をもつハイパスフィルターで構成され、高輝度撮影時に前記ハイパスフィルターのうち高いカットオフ周波数を持つフィルターの出力をもとに前記レンズ制御部が前記被写体の合焦点へ前記焦点調節用レンズ部を制御することを特徴とする請求項１記載の自動焦点調節装置。

【請求項５】請求項１から請求項４のいずれかに記載の自動焦点調節装置を備えていることを特徴とするビデオカメラ。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は、ビデオカメラやスチルカメラなどの焦点調節に関し、特に高輝度被写体の撮影状態において、撮影すべき被写体の像を最適な焦点位置に自動的にフォーカシングする自動焦点調節装置とその自動焦点調節装置を備えたビデオカメラに関するものである。

【０００２】

【従来の技術】ビデオカメラなどの撮像システムにおいて、重要な機能である自動焦点調節装置（オートフォーカス）については、既に何種類かの方式が提案・実施されている。その中の１つであるビデオカメラの映像信号を利用する方式（「山登り方式」と称する）については、例えば「山登りサーボ方式によるテレビカメラの自動焦点調整」（「ＮＨＫ技術研究」第１７巻　第１号２１頁　昭和４０年発行石田他）の論文に詳細に発表されている。また、特願昭６３－２４８１９８号では「山登り方式」における山登り始動時の方向判定に撮影レンズの一部を光軸方向に振動させて応答性を改善する方式が開示されている。

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【０００３】この他に、撮影レンズとは別の光学系を用い被写体の位相差を検出して自動焦点調節を行う位相差検出方式の自動焦点調節装置や赤外線などを用い被写体の距離を測定し自動焦点調節を行ういわゆるアクティブ方式の自動焦点調節装置などが従来より提案されている。

【０００４】

【発明が解決しようとする課題】上に述べた映像信号を利用する方式では、撮影レンズを移動させ、被写体の映像信号に含まれる一定値以上の周波数成分（以後、高周波成分と称する）のレベルの変化により、ピントを合わせるため撮影レンズを移動させるべき方向（以後、合焦方向と称する）、および合焦位置を検出している。この方式は映像信号そのものを利用するためアクティブ方式の自動焦点調節に比べ、合焦精度が高くなる、別の光学系を必要としないなど多くの長所を有している。

【０００５】しかし、蛍光灯などの高輝度の被写体の場合、高周波成分の量は必ずしも合焦時に大きくならず、自動焦点調節に誤動作を生じてしまう場合があり、非常に大きな問題となっていた。この問題は、高周波成分を抽出するハイパスフィルターのカットオフ周波数が適切でない（低すぎる）ことが大きな原因である。しかし単にカットオフ周波数を高くすると、高輝度を含まない一般被写体を撮影したときに高周波成分の量が少なくなってしまい、低コントラスト、低照度に対して合焦可能な信号が抽出できなくなってしまう。ゆえに高輝度被写体に対する自動焦点調節は高輝度情報の的確な判断と、判断に基づいてどのように信号を処理するかが大きな課題であった。

【０００６】本発明はかかる点に鑑み、高輝度の被写体に対して誤動作のない、応答性の良い自動焦点調節装置を提供することを目的とする。

【０００７】

【課題を解決するための手段】上記目的を達するために、本発明の自動焦点調節装置およびビデオカメラは、被写体を撮影する撮影レンズと、２種類以上のカットオフ周波数をもつハイパスフィルターで構成され前記被写体の焦点情報を検出する焦点検出手段と、前記焦点情報の検出範囲において輝度成分がある輝度設定値を越える画像のサンプル点あるいは走査線のカウント値を出力する高輝度検出手段と、前記撮影レンズの一部であって、焦点調節機能を有する焦点調節用レンズ部を前記撮影レンズの光軸上に沿って移動させ焦点調節を行うレンズ駆動手段と、前記レンズ駆動手段に前記焦点調節用レンズ部を駆動すべき方向、駆動速度あるいは停止を指示するレンズ制御部を備えたものである。

【０００８】

【作用】本発明は上記した構成によって、高輝度検出手段の信号で焦点信号検出手段の出力を制御することにより、高輝度被写体時の焦点調節用レンズ部の駆動および停止を実行させることにより、常に誤動作することのない安定で応答性の良好な自動焦点調節を実現する。

【０００９】

【実施例】以下、本発明の自動焦点調節装置の実施例について図面を参照しながら説明する。図１は本発明の第１の実施例の構成を示すものである。

【００１０】図１において、１はズームレンズであり、４個のレンズ群より構成されている（各レンズ群は便宜上各々１枚の凸レンズ、あるいは凹レンズより構成される。本図において各々１ａ～１ｄにて示す）。

【００１１】被写体２の像はズームレンズ１を介しＣＣＤ３に入力される。カメラプロセス回路４はＣＣＤ３より得られる電気信号に各種信号処理を施し、所定の映像信号（例えばＮＴＳＣ信号）Ｃ。を出力する。焦点検出手段５はカメラプロセス回路４より出力される輝度信号Ｙより撮影レンズ１のピント状態に対応した焦点信号ＶFh、ＶFlをフィールド周期で演算し、出力する。ここで輝度信号Ｙは１フィールドの画像において、焦点検出をすべき領域でゲートがかけられた信号とする。なお、領域限定のゲートは焦点検出手段５でかけてもよい。

【００１２】レンズ制御部６は焦点検出手段５の過去のフィールドの焦点信号と現在のフィールド焦点信号との差分値（△ＶFh、△ＶFl）を演算し、この差分値△ＶFh、△ＶFlの符号、絶対値および焦点信号ＶFh、ＶFlの絶対値より撮影レンズの合焦状態を判断し、モータ駆動部７にステッピングモータ８の駆動速度、および駆動方向を各々規定するクロック信号、および正逆転信号を供給する。

【００１３】モータ駆動部７はクロック信号、および正逆転信号に基づきステッピングモータ８を駆動し、ステッピングモータ８はズームレンズ１の第１群１ａを所定の位置まで移動させ、自動焦点調節が実行される。

【００１４】以上が基本的な山登り制御の動作説明である。次に高輝度検出手段９の出力結果を用い、駆動条件を変更した山登り制御の動作説明を行い、本発明の要点である高輝度時の合焦動作が如何にして達成されるかを説明する。

【００１５】カメラプロセス回路４より出力される輝度信号Ｙは、高輝度検出手段９に入力され、まず比較器１０にて輝度信号Ｙとレンズ制御部６で設定された一定値Ｌｅｖとの比較が行われる。比較器１０は一定値Ｌｅｖより輝度信号Ｙが大きい場合に「１」、その他の条件で「０」を出力し、カウンタ１１にて画像のサンプル点における高輝度点のカウント数ＨＳが出力される。カウント数ＨＳはレンズ制御部６にて高輝度と判断すべき一定値と比較され、高輝度の場合「１」、そうでない場合

「０」となる比較信号Ｓを出力する。

【００１６】一方、焦点検出手段５に入力した輝度信号Ｙは、低域通過フィルターであるＬＰＦ１２にてノイズをカットされ、図２に示すような、それぞれカットオフ周波数の異なる高域通過フィルターＨＰＦａ１３、ＨＰＦｂ１４、ＨＰＦｃ１５で微分される。ＨＰＦｃ１５の出力は検波器１６にてピーク値が検波され、焦点信号ＶFlをレンズ制御部６へ出力する。ＨＰＦａ１３、ＨＰＦｂ１４の出力はスイッチＳＷ１７にて前記比較信号Ｓが「１」であればＨＰＦａ１３の出力、「０」であればＨＰＦｂ１４の出力が選択され、検波器１８にてピーク値が検波され、焦点信号ＶFhをレンズ制御部６へ出力する。

【００１７】画面に高輝度被写体がある場合、図３に示すようにレンズ１ａの動きに対してＨＰＦａ１３の出力は合焦点でピークになり、ＨＰＦｂ１４の出力は合焦点以外でピークをもつ。ゆえに高輝度被写体撮影時に比較信号Ｓが「１」になりＨＰＦａ１３の出力が選択されれば、前述の山登り制御により誤動作のない合焦動作が可能になる。

【００１８】なお、比較器１０に入力する一定値Ｌｅｖは画像の飽和レベルの３／４程度、また高輝度を判定するカウント数ＨＬは前サンプル数の約１／１０が望ましい。

【００１９】上記実施例では、図１におけるズームレンズ１のフォーカス調整に用いるレンズ群を１ａとしているが、一般的にインナーフォーカス方式と呼ばれるズームレンズで用いられているレンズ群１ｂ～１ｄをフォーカス調整に用いても良い。

【００２０】次に本発明の第２の実施例を以下に述べる。図４は本発明の第２の実施例であり、高輝度検出手段を別の構成にしたものである。高輝度検出手段１９以外は第１の実施例と同じ構成である。

【００２１】高輝度検出手段１９において、まず輝度信号Ｙはピーク検波器２０により走査線１ラインにおけるピーク値Ｐがホールドされる。これとレンズ制御部６からの一定値Ｌｅｖとを比較器２１で比較し、一定値Ｌｅｖよりピーク値Ｐが大きい場合に「１」、その他の条件で「０」を出力し、カウンタ２２にて焦点検出範囲における高輝度の存在する走査線のラインのカウント数ＨＬが出力される。以降、前述の制御により高輝度時に誤動作のない合焦動作が可能になる。なお、カウント数ＨＬによる高輝度の判定は、焦点検出範囲の全走査線数の約１／５のライン数が望ましい。

【００２２】以上説明した自動焦点調節装置は撮像素子を使う撮像システムとして代表的なビデオカメラに用いれば、動画の録画に対して被写体のボケを感じさせない高品位な画像を提供できる。

【００２３】

【発明の効果】以上述べたように本発明は、上記した構

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成によって、高輝度検出手段の信号で焦点信号検出手段の出力を制御することにより、高輝度被写体時の焦点調節用レンズ部の駆動および停止を実行させ、常に誤動作することのない安定で応答性の良好な焦点調節を可能とし、自動焦点調節に極めて優れた効果を有するものである。また撮像素子を用いる代表的な電子機器として、常に高品位な映像を提供するビデオカメラが実現できる。

【図面の簡単な説明】

【図１】本発明の第１の実施例の自動焦点調節装置の構成図

【図２】第１の実施例の自動焦点調節装置における高域通過フィルターの周波数特性図

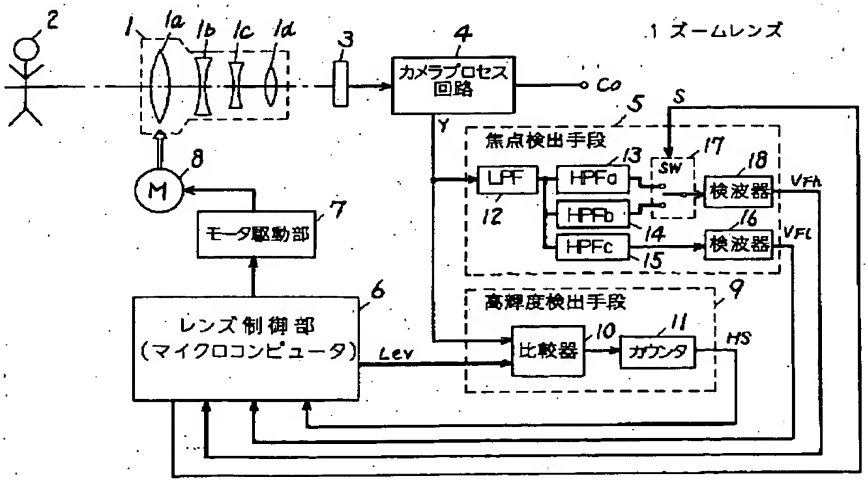
【図３】高輝度被写体撮影時のフォーカス移動にともなう焦点信号の変化を示す特性図

【図４】本発明の第２の実施例である高輝度検出手段のブロック図

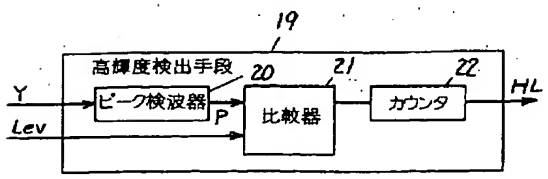
【符号の説明】

１　ズームレンズ
２　被写体
３　撮像素子
＊４　カメラプロセス回路
５　焦点検出手段
６　レンズ制御部
７　モータ駆動部
８　ステッピングモータ
９　高輝度検出手段
１０　比較器
１１　カウンタ
１２　低域通過フィルター
１３　高域通過フィルター
１４　高域通過フィルター
１５　高域通過フィルター
１６　検波器
１７　スイッチ
１８　検波器
１９　高輝度検出手段
２０　ピーク検波器
２１　比較器
２２　カウンタ

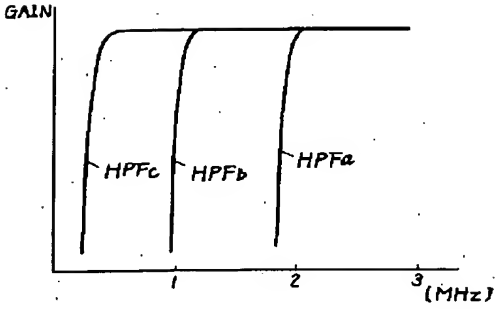
【図１】



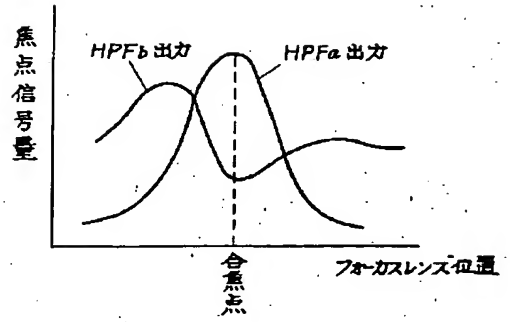
【図４】



【図２】


GAIN
HPFc
HPFb
HPFa
1
2
3
(MHz)

【図３】


焦点信号量
HPFb 出力
HPFa 出力
合焦点
フォーカスレンズ位置

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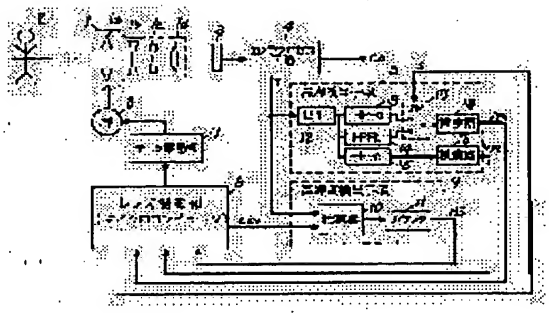
(72)Inventor : ISHIGURO KEIZO
ITO TOMONOBU
TOYOMURA KOICHI

(54) AUTOMATIC FOCUS ADJUSTMENT DEVICE AND VIDEO CAMERA

(57)Abstract:
PURPOSE: To obtain the automatic focus adjustment device with excellent response without malfunction to an object with high brightness by controlling an output of a focus signal detection means with a signal from a high brightness detection means.
CONSTITUTION: A luminance signal Y outputted from a camera process circuit 4 is inputted to a high brightness detection means 9, in which a luminance signal Y and a prescribed value Lev set by a lens control section 6 are compared at first by a comparator 10. The comparator 10 outputs a level 1 when the luminance signal Y is larger than the prescribed level Lev and outputs 0 in other conditions. On the other hand, the luminance signal Y inputted to a focus detection means 5 is differentiated by high pass filters HPFa13, HPFb14, HPFc15 whose cut-off frequency differs from each other. An output from the HPFa13 is selected when the comparator signal is logical 1 and an output from the HPFb14 is selected when the comparator signal is logical 0 by a switch SW17, a detector 18 detects a peak level and a focus signal VFh is outputted to a lens control section 6.



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* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1] The lens driving means which are characterized by providing the following and which are made to move the lens section for focuses along the optical-axis top of the aforementioned taking lens, and perform a focus, It has the lens control section which directs the direction, the drive speed, or a halt which should drive the aforementioned lens section for focuses to the aforementioned lens driving means. The aforementioned lens control section is an automatic-focusing adjustment characterized by controlling the aforementioned lens section for focuses to the aforementioned photographic subject's focusing point based on the detection result of the aforementioned focal detection means, and the detection result of the aforementioned quantity brightness detection means. The taking lens which photos a photographic subject A focal detection means to detect the aforementioned photographic subject's focal information A high brightness detection means to output the counted value of the sample point of the picture exceeding the brightness set point which has a brightness component in the detection range of the aforementioned focal information It is a part of aforementioned taking lens, and is a focus function.
[Claim 2] A lens control section is an automatic-focusing adjustment according to claim 1 characterized by judging it as a high brightness photography state when the counted value which is the output of a high brightness detection means exceeds the fixed set point, and controlling the lens section for focuses to a photographic subject's focusing point.
[Claim 3] A high brightness detection means is an automatic-focusing adjustment according to claim 1 characterized by outputting the counted value of the number of the scanning line exceeding the brightness set point which has a brightness component in the detection range of focal information.
[Claim 4] A focal detection means is an automatic-focusing adjustment according to claim 1 characterized by the aforementioned lens control section controlling the aforementioned lens section for focuses to the aforementioned photographic subject's focusing point based on the output of the filter which consists of high-pass filters with at least two kinds of cut off frequencies, and has a high cut off frequency among the aforementioned high-pass filters at the time of high brightness photography.
[Claim 5] The video camera characterized by equipping either of a claim 1 to the claims 4 with the automatic-focusing adjustment of a publication.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] Especially this invention relates to the video camera equipped with the automatic-focusing adjustment which carries out focusing of a photographic subject's image which should be photoed to the optimal focal position automatically, and its automatic-focusing adjustment in a high brightness photographic subject's photography condition about focuses, such as a video camera and a still camera.
[0002]
[Description of the Prior Art] In image pck-up systems, such as a video camera, how many kinds of those methods are already proposed and carried out about the automatic-focusing adjustment (autofocus) which is an important function. The method (a "mountain-climbing method" is called) using the video signal of the video camera which is one in it is announced in detail by the paper of "automatic-focusing adjustment of the television camera by the mountain-climbing servo system" (others [Ishida / "NHK technical research" of volume / 17th / 1 No. 21 pag Showa 40 issue]), for example. Moreover, in Japanese Patent Application No. No. 248198 [63 to], the method which a part of taking lens is vibrated in the direction of an optical axis to the direction judging at the time of mountain-climbing starting in a "mountain-climbing method", and improves responsibility is indicated.
[0003] In addition, the so-called automatic-focusing adjustment of the active method which measures a photographic subject's distance using an automatic-focusing adjustment, infrared radiation, etc. of a phase contrast detection method which detect a photographic subject's phase contrast using optical system different from a taking lens, and perform automatic-focusing regulation, and performs automatic-focusing regulation etc. is proposed conventionally.
[0004]
[Problem(s) to be Solved by the Invention] By the method using the video signal described above, the taking lens was moved, and by change of the level of the frequency component more than the constant value contained in a photographic subject's video signal (a high frequency component is called henceforth), in order to double a focus, the direction (the focus direction is called henceforth) to which a taking lens should be moved, and the focus position are detected. This method has many advantages, such as that focus precision becomes high and not needing another optical system compared with automatic-focusing regulation of an active method, in order to use the video signal itself.
[0005] However, in the case of photographic subjects of high brightness, such as a fluorescent lamp, the amount of a high frequency component did not necessarily become large at the time of a focus, but may produce a malfunction in automatic-focusing regulation, and had become a very big problem. This problem is the cause that the thing (too low) for which the cut off frequency of a high-pass filter which extracts a high frequency component is not suitable is big. When the cut off frequency was only made high and the general photographic subject which does not contain high brightness is photoed, the amount of a high frequency component will decrease, and it will become impossible however, to extract the signal which can focus to low contrast and a low illuminance. Therefore, the automatic-focusing regulation to a high brightness photographic subject was a technical problem with how big a signal is processed based on adequate judgment of high brightness information, and judgment.
[0006] this invention aims at offering the rapid response automatic-focusing adjustment which does not have a malfunction to the photographic subject of high brightness in view of this point.
[0007]
[Means for Solving the Problem] Since the above-mentioned purpose is attained, the automatic-focusing adjustment and video camera of this invention The taking lens which photos a photographic subject, and a focal detection means to consist of high-pass filters with two or more kinds of cut off frequencies, and to detect the aforementioned photographic subject's focal information, A high brightness detection means to output the sample point of the picture exceeding the brightness set point which has a brightness component in the detection range of the aforementioned focal information, or the counted value of the scanning line, The lens driving means which are made to move the lens section for focuses which is a part of aforementioned taking lens, and has a focus function along the optical-axis top of the aforementioned taking lens, and perform a focus, It has the lens control section which directs the direction, the drive speed, or a halt which should drive the aforementioned lens section for focuses to the aforementioned lens driving means.
[0008]
[Function] By controlling the output of a focal signal-detection means by the signal of a high brightness detection means, by performing the drive and halt of the lens section for focuses at the time of a high brightness photographic subject, always malfunctioning twists this invention, and it is stable and realizes automatic-focusing regulation with good responsibility by the above-mentioned composition.

[0009]
[Example] Hereafter, it explains, referring to a drawing about the example of the automatic-focusing adjustment of this invention. Drawing 1 shows the composition of the 1st example of this invention.
[0010] In drawing 1 , 1 is a zoom lens and consists of four lens groups (each lens group consists of a convex l ns of one sheet, or a concave lens respectively for convenience.). 1a-1d show this view respectively.
[0011] A photographic subject's 2 image is inputted into CCD3 through a zoom lens 1. The cam ra proc ss circuit 4 performs various signal processing to the electrical signal acquired from CCD3, and is the predet rmin d vid o signal (for example, NTSC signal) CO. It outputs. From the luminance signal Y outputted from the camera process circuit 4, the focal signals VFh and VFl corresponding to the focus state of a taking lens 1 are calculated a field period, and the focal detection means 5 outputs them. A luminance signal Y is taken as the signal with which the gate was applied in the field which should carry out focal detection in the picture of the 1 field here. In addition, th gate of field limitation may go out focal detection means 5.
[0012] difference with the field focal signal of the focal signal of the field of the past of the focal detection means 5 and present — a value (**VFh, **VFl) — calculating — this difference — the focus state of a taking lens is judged from the sign of value **VFh and **VFl, an absolute value, and the absolute value of the focal signals VFh and VFl; and the clock signal which specifies respectively the drive speed of a stepping motor 8 and a driving direction in the motorised section 7, and a right inversion signal
[0013] The motorised section 7 drives a stepping motor 8 based on a clock signal and a right inversion signal, a stepping motor 8 moves 1st group 1a of a zoom lens 1 to a position, and automatic-focusing regulation is performed.
[0014] The above is explanation of fundamental mountain-climbing control of operation. Next, explanation of the mountain-climbing control which changed drive conditions of operation is given using the output of the high brightness detection means 9, and it explains how focus operation at the time of the high brightness which is the main point of this invention is attained.
[0015] The luminance signal Y outputted from the camera process circuit 4 is inputted into the high brightness detection means 9, and comparison with a luminance signal Y and the constant value Lev set up at the lens control section 6 is first performed by the comparator 10. From constant value Lev, as for a comparator 10, a luminance signal Y outputs "0" on condition that "1" and others, when large, and the number of counts HS of the high brightness point in the sample point of a picture is outputted by the counter 11. The number of counts HS is compared with the constant value which should be judged to be high brightness by the lens control section 6, and in high brightness, "1" and when that is not right, it outputs the comparison signal S used as "0."
[0016] On the other hand, the luminance signal Y inputted into the focal detection means 5 is differentiated by the highpass filters HPFa13, HPFb14, and HPFc15 from which a cut off frequency differs, respectively as a noise cut by LPF12 which is a low pass filter and shown in drawing 2 . Peak value is detected with a wave detector 16, and the output of HPFc15 outputs the focal signal VFl to the lens control section 6. With a switch SW17, if the aforementioned comparison signal S is "1" and it is the output of HPFa13, and "0", the output of HPFb14 will be chosen, peak value is detected with a wave detector 18, and the output of HPFa13 and HPFb14 outputs the focal signal VFh to the lens control section 6.
[0017] When a high brightness photographic subject is shown in a screen, as shown in drawing 3 , the output of HPFa13 becomes a peak at a focusing point to the movement of lens 1a, and the output of HPFb14 has a peak except a focusing point. Therefore, if the comparison signal S is set to "1" and the output of HPFa13 is chosen at the time of high brightness photographic subject photography, focus operation which does not have a malfunction by the above-mentioned mountain-climbing control will be attained.
[0018] In addition, the number of counts HL which judges about 3/4 and the high brightness of the saturation level of a picture has [the constant value Lev inputted into a comparator 10] the desirable abbreviation 1/10 of a front measurement size.
[0019] Although the lens group used for focal adjustment of the zoom lens 1 in drawing 1 is set to 1a in the above-mentioned example, you may use for focal adjustment the lens groups 1b-1d used with the zoom lens generally called inner focus method.
[0020] Next, the 2nd example of this invention is described below. Drawing 4 is the 2nd example of this invention, and makes a high brightness detection means another composition. It is the same composition as the 1st example except high brightness detection means 19.
[0021] In the high brightness detection means 19, as for a luminance signal Y, peak value P in the scanning line of one line is first held by the peak wave detector 20. A comparator 21 compares this and the constant value Lev from the lens control section 6, from constant value Lev, peak value P outputs "0" on condition that "1" and others, when large, and the number of counts HL of the line of the scanning line in which the high brightness in the focal detection range exists by the counter 22 is outputted. Henceforth, focus operation which does not have a malfunction by the above-mentioned control at the time of high brightness is attained. In addition, the judgment of high brightness by the number of counts HL has the desirable number of lines of the abbreviation 1/5 of all the number of scanning lines of the focal detection range.
[0022] The automatic-focusing adjustment explained above can offer the high-definition picture in which dotage of a photographic subject is not impressed to the videotape recording of an animation, if it uses for a video camera typical as an image pck-up system using an image pck-up element.
[0023]
[Effect of the Invention] The drive and a halt of the lens section for focuses at the time of a high brightness photographic subject are performed, and it is stable, a focus with good responsibility is made possible, and it has the effect which always does not malfunction and which was extremely excellent in automatic-focusing regulation by controlling the output of a focal signal-detection means by composition which was described above and which

described this invention above like by the signal of a high brightness detection means. Moreover, the video camera which offers an always high-definition image as typical electronic equipment using an image pck-up element is realizable.

[Translation done.]

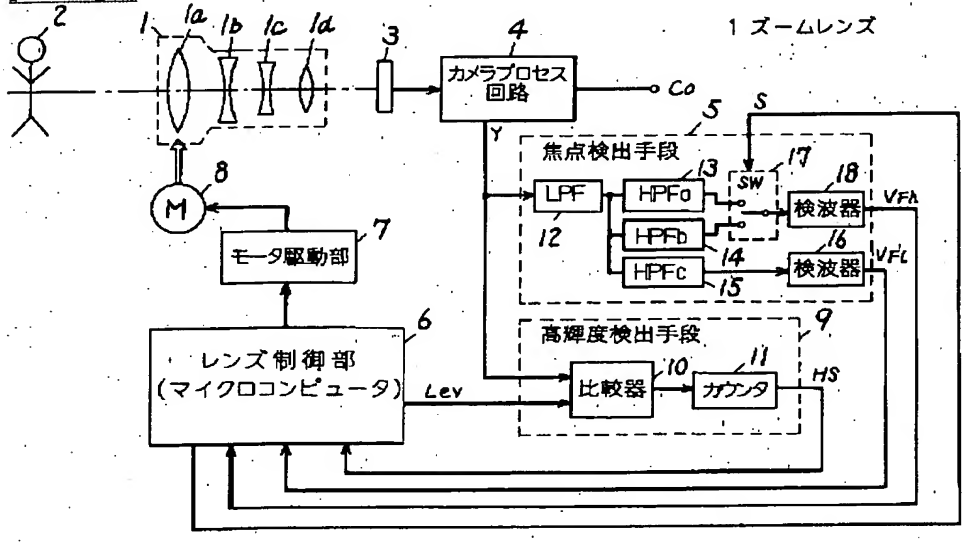
DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] The block diagram of the automatic-focusing adjustment of the 1st example of this invention
[Drawing 2] The frequency characteristic view of the highpass filter in the automatic-focusing adjustment of the 1st example
[Drawing 3] The property view showing change of the focal signal accompanying focal movement at the time of high brightness photographic subject photography
[Drawing 4] The block diagram of the high brightness detection means which is the 2nd example of this invention
[Description of Notations]
1 Zoom Lens
2 Photographic Subject
3 Image Pck-up Element
4 Camera Process Circuit
5 Focal Detection Means
6 Lens Control Section
7 Motorised Section
8 Stepping Motor
9 High Brightness Detection Means
10 Comparator
11 Counter
12 Low Pass Filter
13 Highpass Filter
14 Highpass Filter
15 Highpass Filter
16 Wave Detector
17 Switch
18 Wave Detector
19 High Brightness Detection Means
20 Peak Wave Detector
21 Comparator
22 Counter

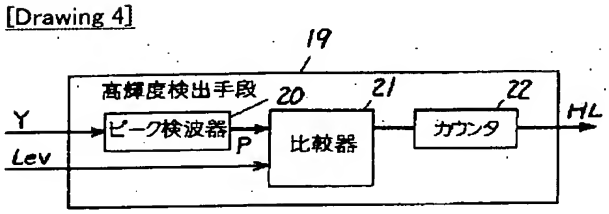
[Translation done.]

DRAWINGS

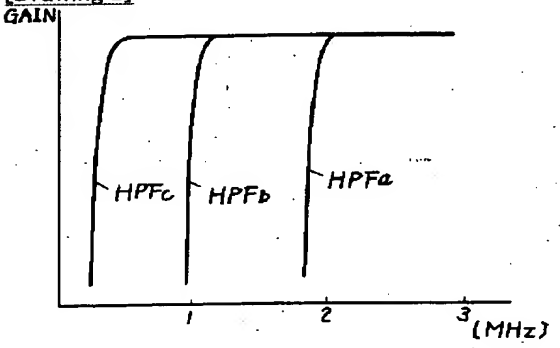
[Drawing 1]



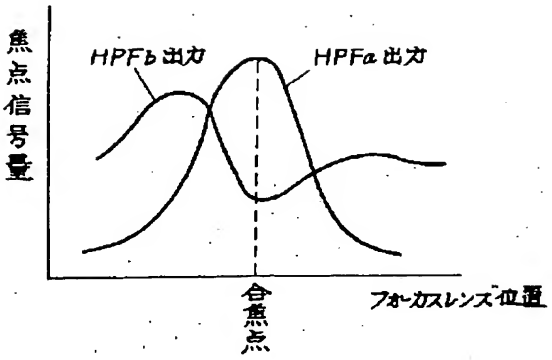
[Drawing 4]



[Drawing 2]



[Drawing 3]



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